

Laser-Wire System for ATF2

Engineering and Installation Issues

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Caveat – Funding Situation

- Grahame Blair has asked me to remind you that

Funding – although applied for and probable

Is not yet guaranteed

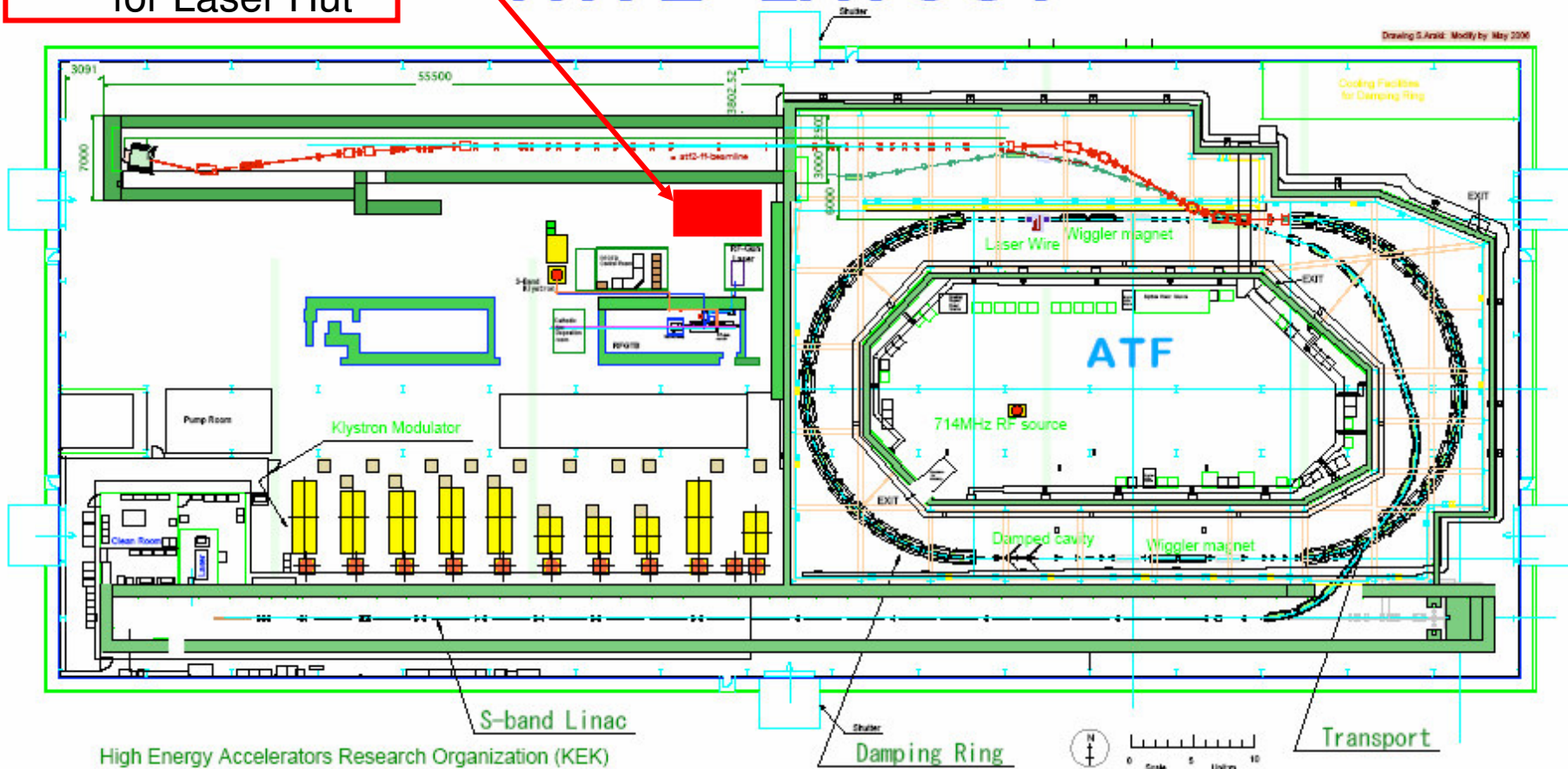
- Grahame will have more to say about this in his talk soon

Laser-wire: installation issues to be resolved

- Laser Hut
 - Location and size
 - Vibration and relative movement of floor
 - Cooling and power requirements
 - Thermal management and temperature stability (Very important)
- Light transport and service cables
 - Space required
- Laser-wire stations
 - Space requirements and support structures
 - Integration with adjacent quadrupoles and BPMs
- Detector
 - Window and space required
 - Clear line of sight (collimators?)
 - Low background (collimators?)
- Laser safety
 - Interlocks and working arrangements in tunnel

Possible Location
for Laser Hut

ATF2 LAYOUT



Laser Hut – suggested location

Laser Hut Requirements

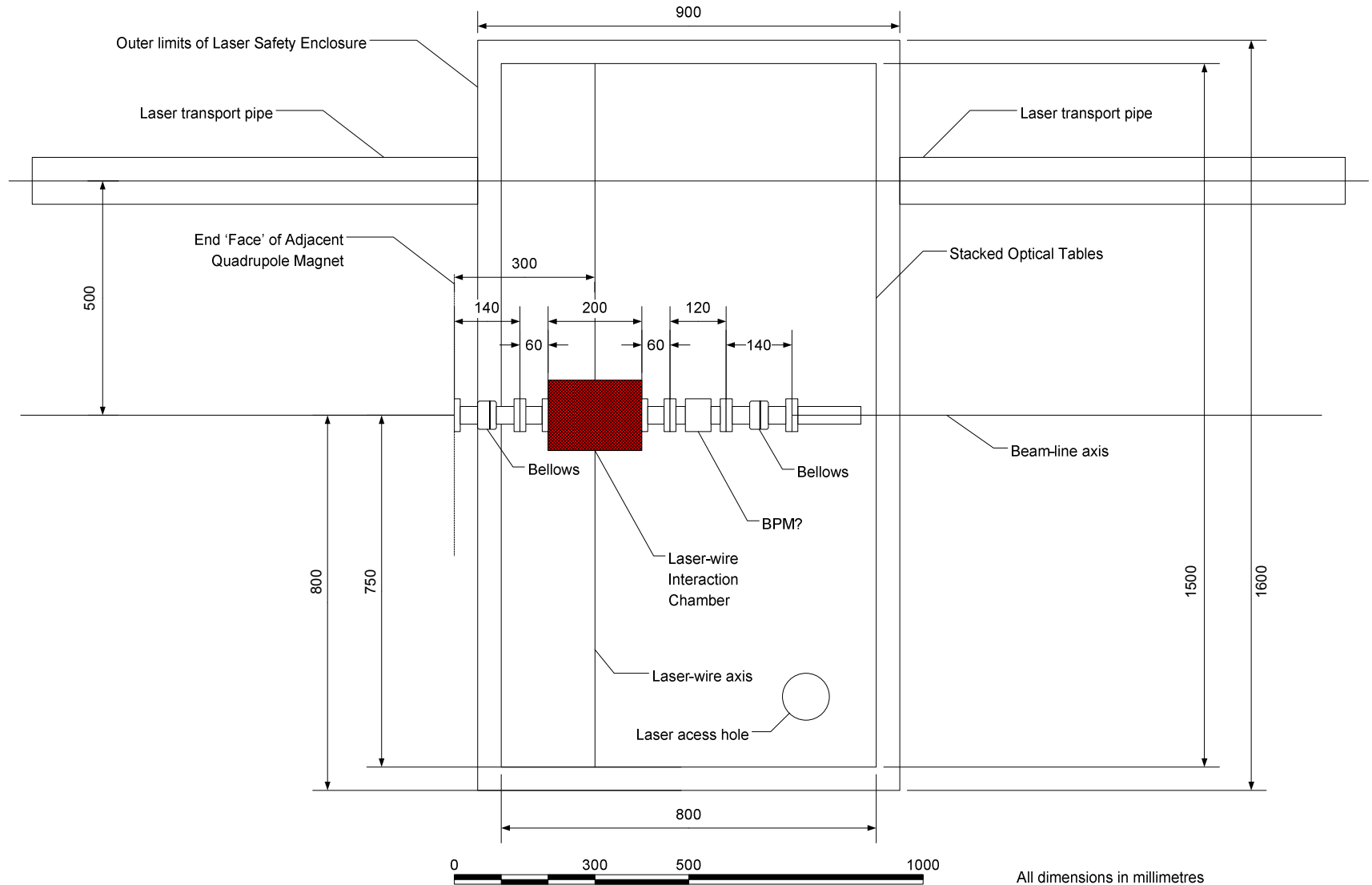
What is the timescale for defining these items?

- Dimensions – Approximately 8m x 5m
 - based on existing hut where optical table is too small
- Floor stability – Ideally on the same foundations as the accelerator
- Power requirements?
- Heat load to cooling system?
- Environmental controls?
 - Temperature stability is very important for reliable laser operation!
- Clean area for optical table?
- Electronics racks?
- Laser safety interlocks and controls?

Light Transport – Proposed Scheme

- Laser light to be distributed inside pipes
- For reasons of laser safety and stability
- Possibly evacuated (to reduce fluctuations in refractive index)
- Approximate diameter 100mm
- Mounted close to the floor, alongside the accelerator
- Support bases for relay lenses at intervals of several metres
- How many access holes required in shield wall?

Initial thoughts on layout of laser-wire measurement station for ATF2



Gamma Detector Requirements

- Exit window at end of straight section
- Direct line of sight required - collimators?
- Space for detector and adequate shielding
- Low background location - collimators?
- Cable access for HV and signal cables to laser hut

Other Issues which affect Laser-wire design

- Alignment – how do we 'connect' to the survey co-ordinate system for the magnets and BPMs?
- Roll angle of e-beam - how well known and stable is this?
- What is maximum possible roll angle at Laser-wire locations?
- Maximum range for e-beam position at Laser-wire stations?
- Stability of this position – over long and short timescales?

Schedule

- Installation can (will) be phased, for example:
 - Bases for Laser-wire stations along beam-line
 - Construct Laser hut
 - Install light transport system
 - Install optical table and services
 - Install and commission laser system
 - Install and commission first laser-wire station
 - Install and commission remaining stations
- Grahame will also discuss the schedule in more detail